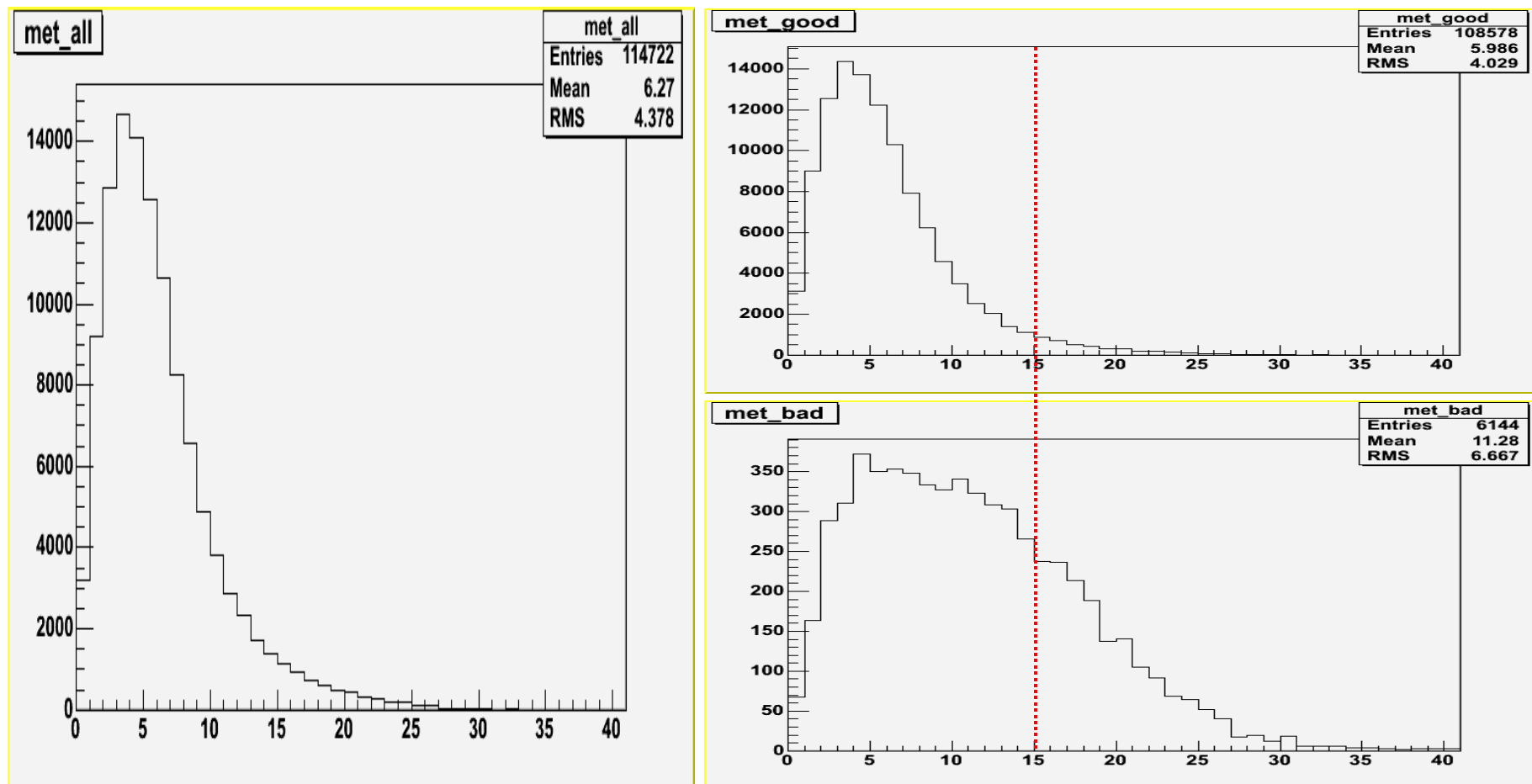


Background study

First, investigating the effect of cutting on missing ET (15GeV) in signal MC:

In the following, missing-ET plots are after selecting tight tag electron, selecting probe track, opposite sign track requirement, $70 < M_{ee} < 110$, jet multiplicity requirement.

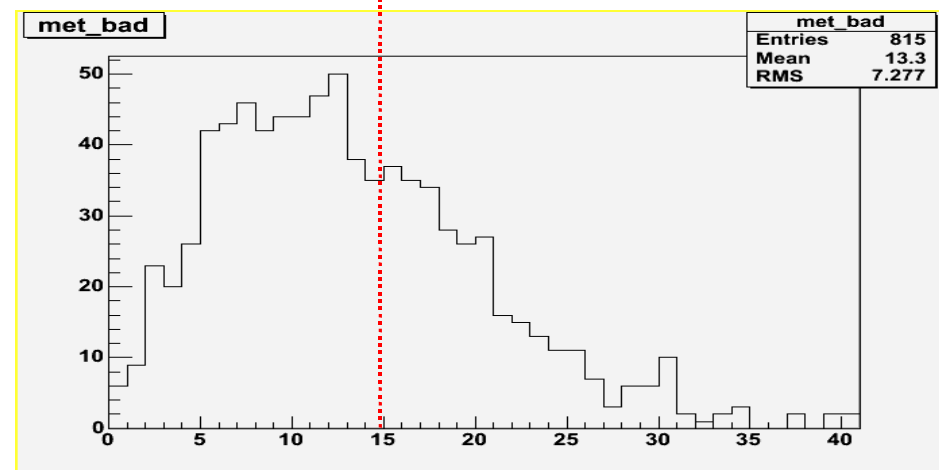
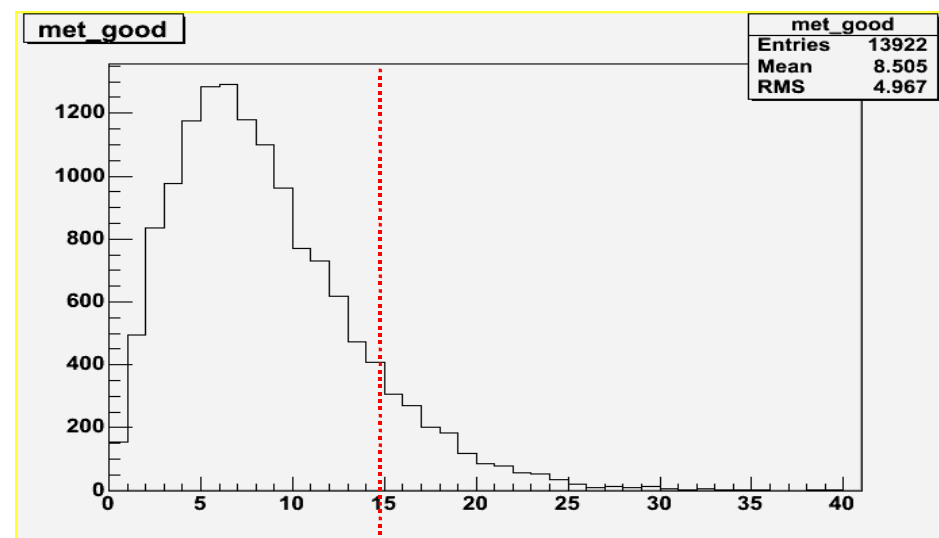
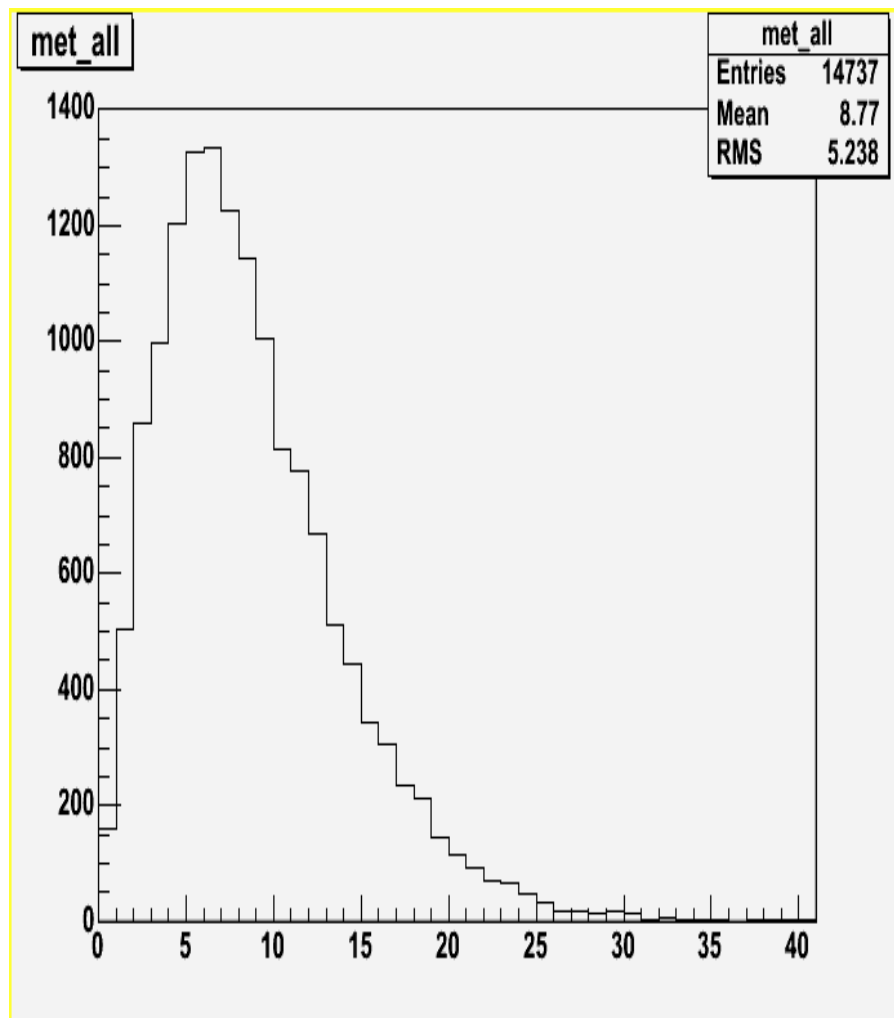
MC: Jetmult ≥ 0



(no missing ET cut) = $94.6 \pm 0.1\%$

(missing $ET < 15\text{GeV}$) = $95.9 \pm 0.1\%$

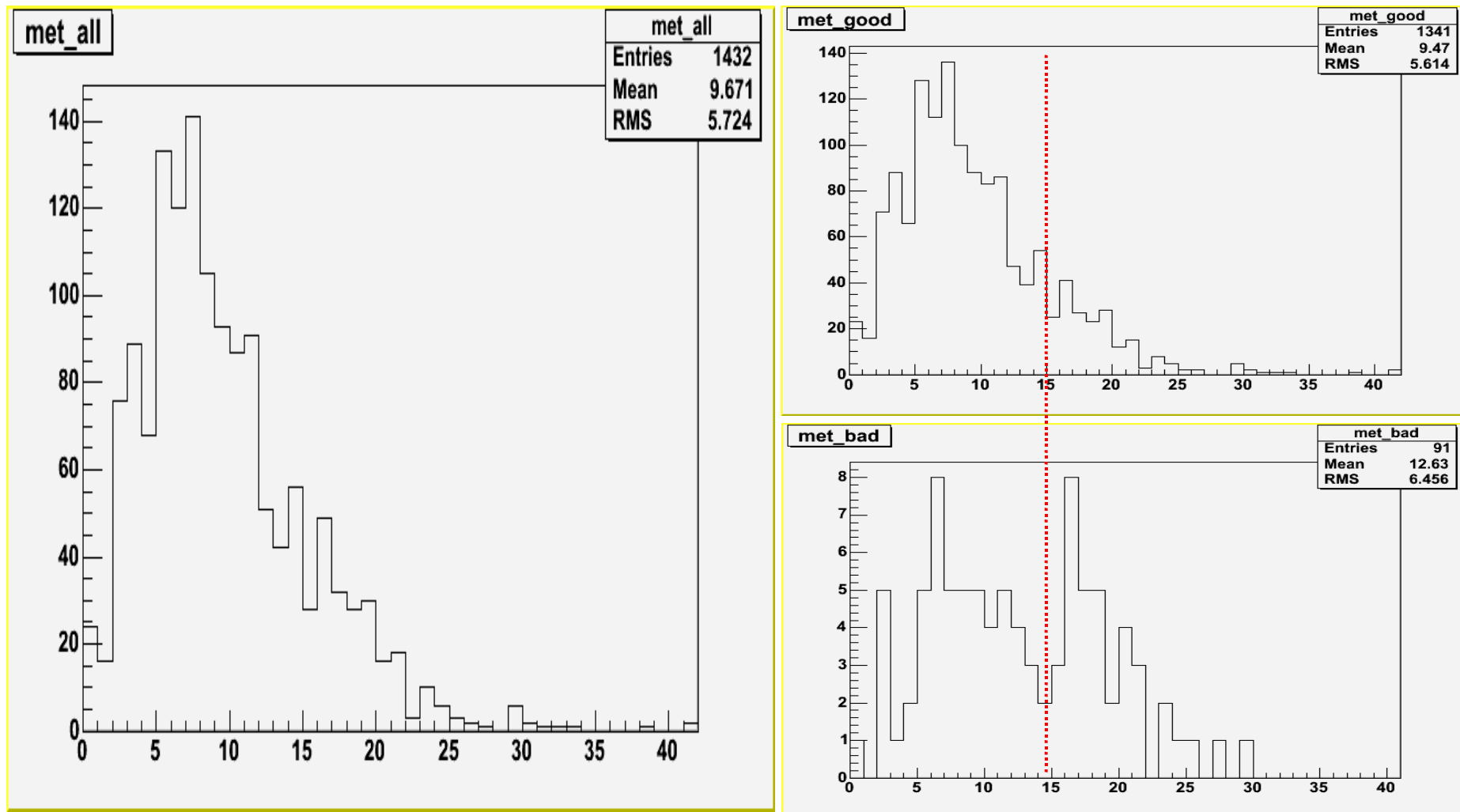
MC: Jetmult ≥ 1



(no missing ET cut) = $94.5 \pm 0.2\%$

(missing $ET < 15\text{GeV}$) = $96.0 \pm 0.2\%$

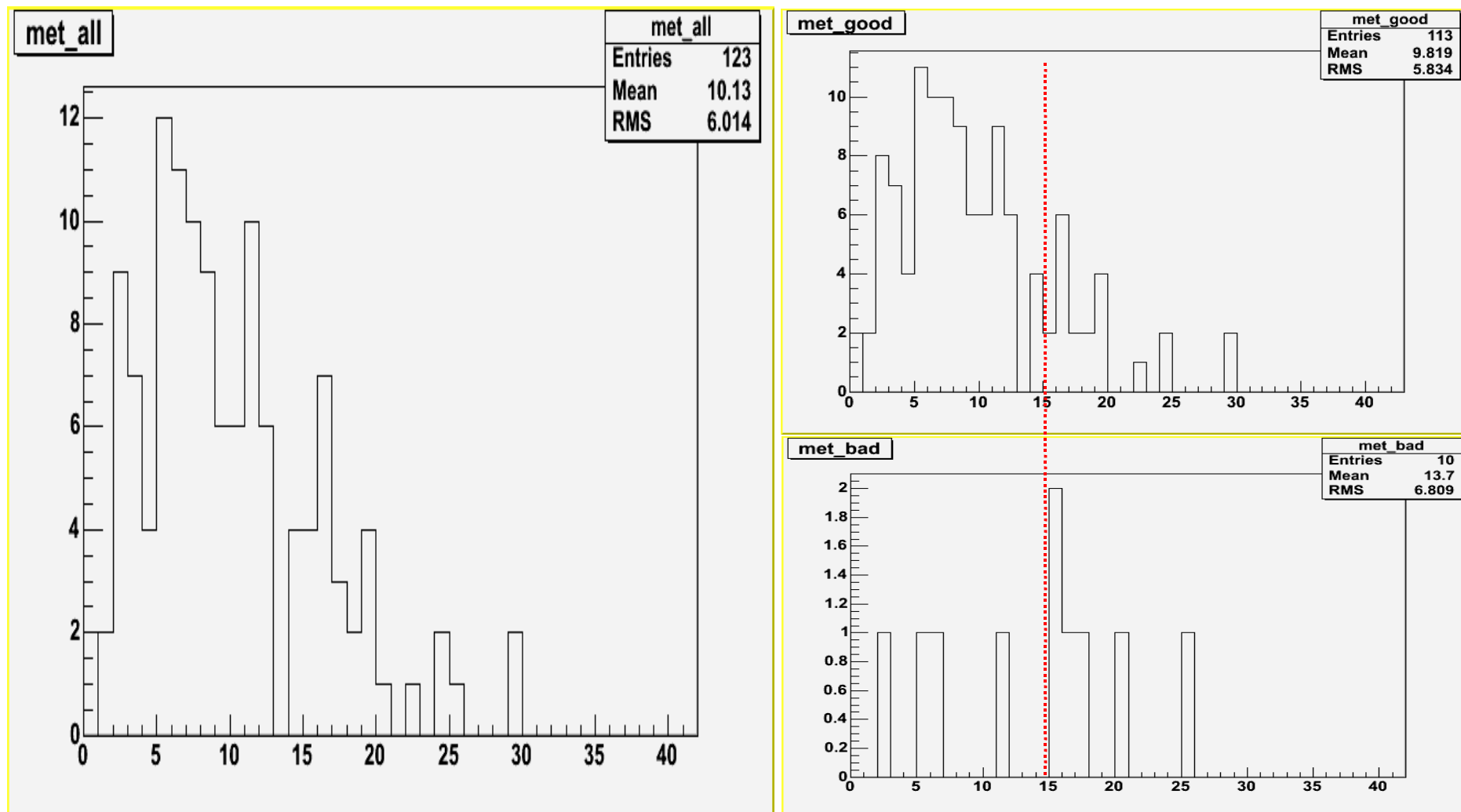
MC: Jetmult ≥ 2



(no missing ET cut) = $93.6 \pm 0.6\%$

(missing $\text{ET} < 15 \text{ GeV}$) = $95.4 \pm 0.6\%$

MC: Jetmult ≥ 3



(no missing ET cut) = $91.7 \pm 2.0\%$

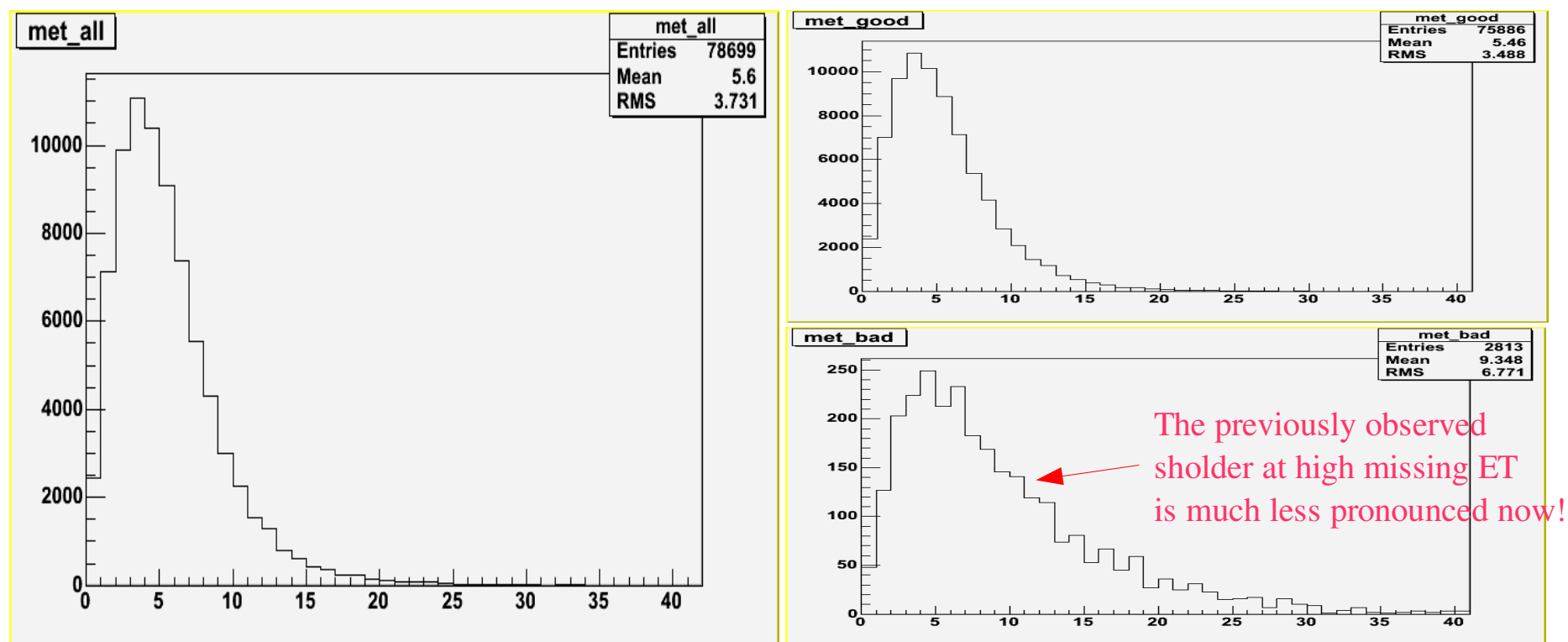
(missing ET < 15 GeV) = $95.8 \pm 2.0\%$

Seems like a lot of missing ET in the inefficient events!

Could it be due to phi cracks?

Redoing $\text{jetmult} \geq 0$ plots (page 3) when cutting on phi cracks:

MC: $\text{Jetmult} \geq 0$



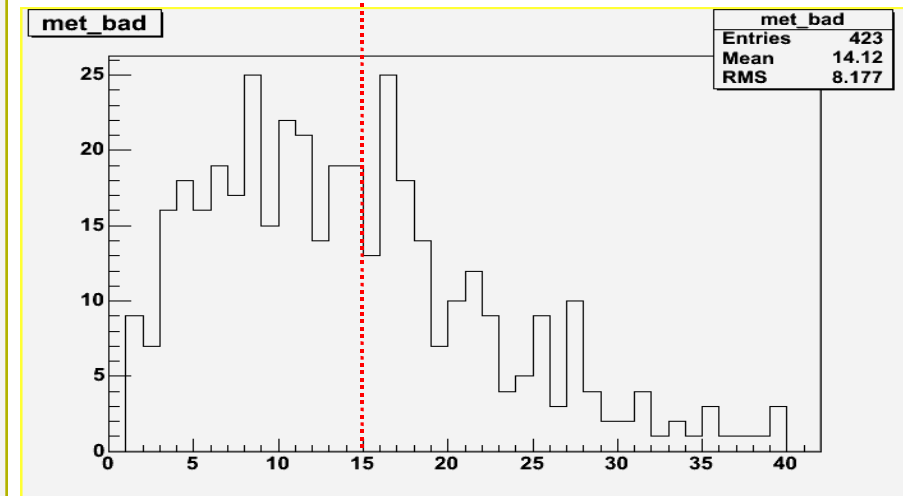
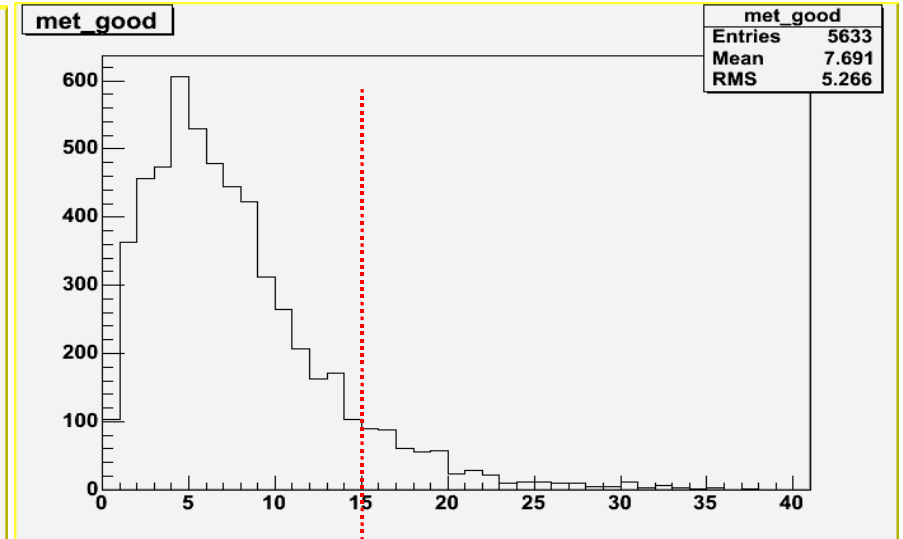
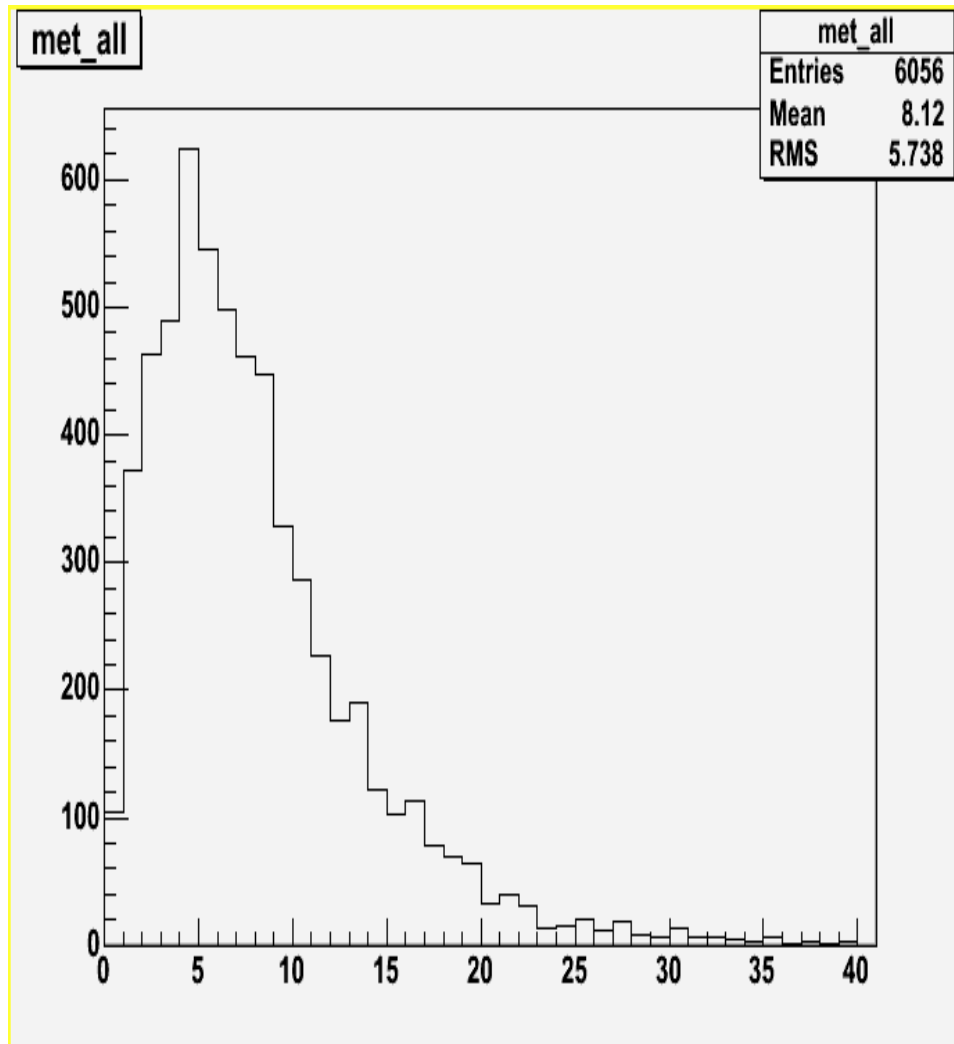
(no missing ET cut, including phi cracks) = 94.6%

(missing $\text{ET} < 15\text{GeV}$, including phi cracks) = 95.9%

(missing $\text{ET} < 15\text{GeV}$, excluding phi cracks) = 96.4%

Now doing the same in data ...

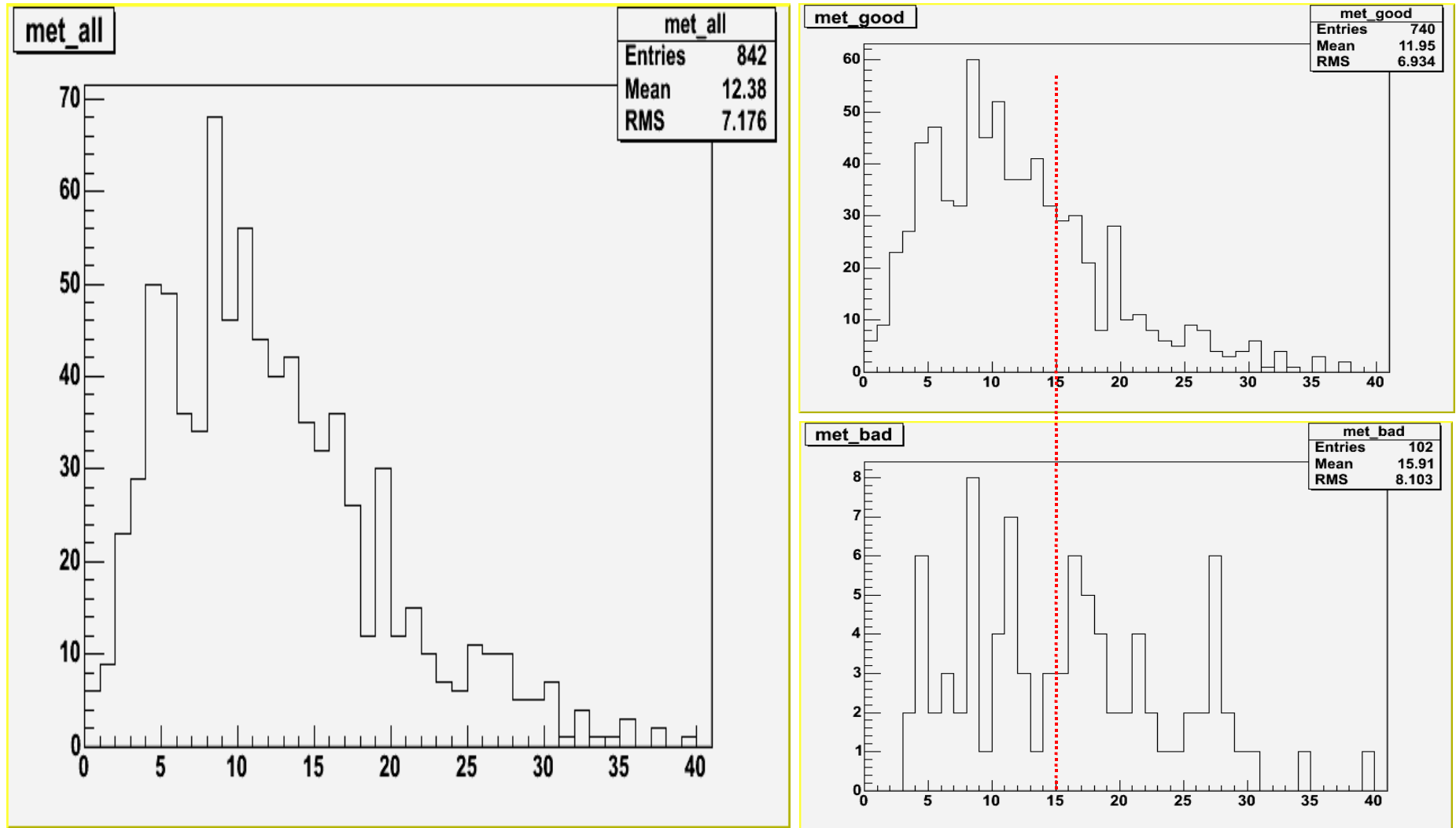
data: Jetmult ≥ 0



(no missing ET cut) = 93.0 \pm 0.3%

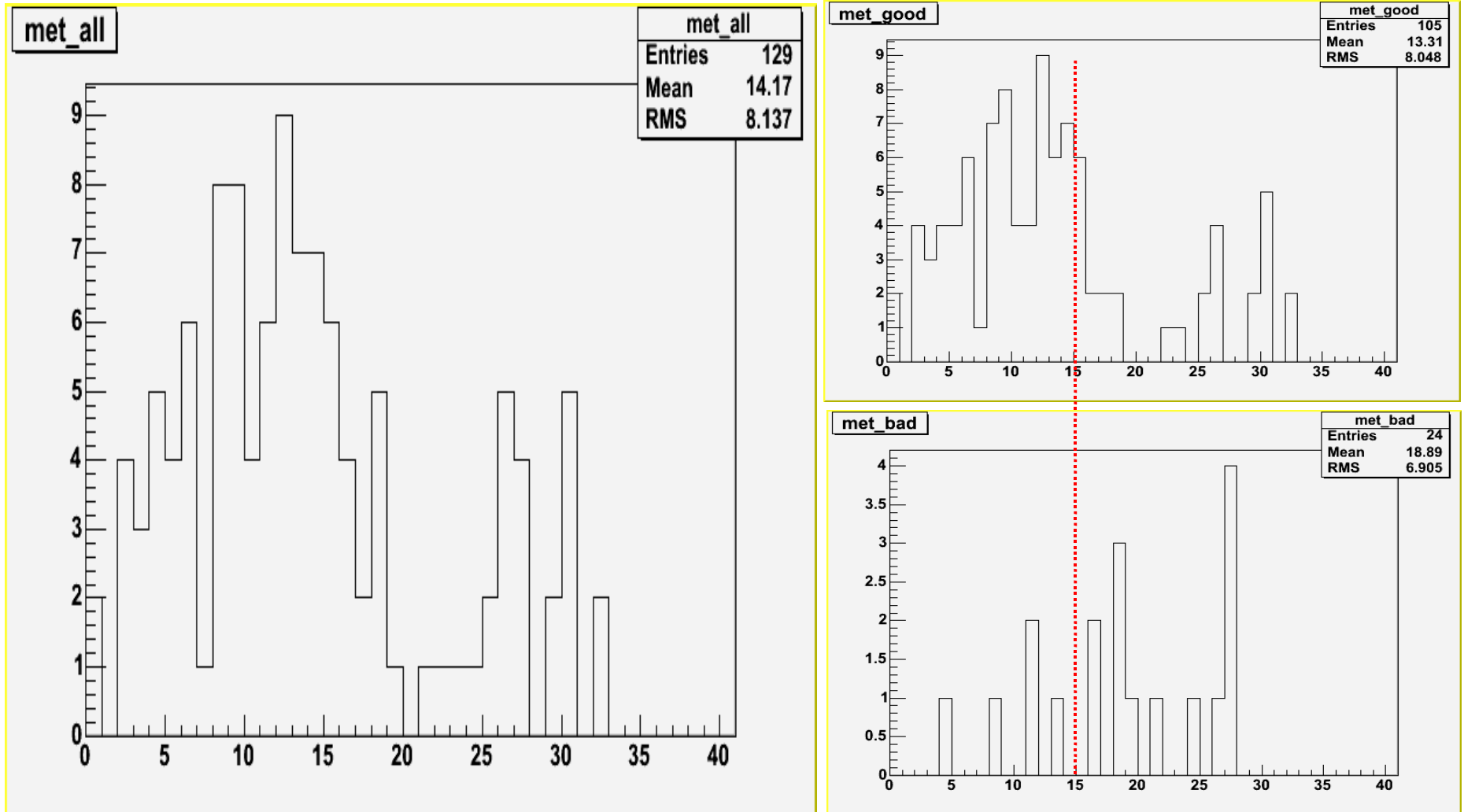
(missing ET<15GeV) = 95.6 \pm 0.3%

data: Jetmult ≥ 1



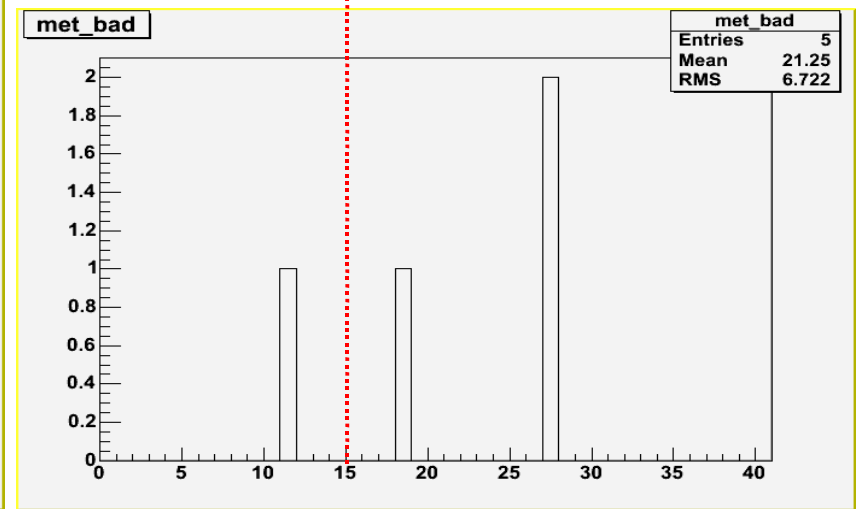
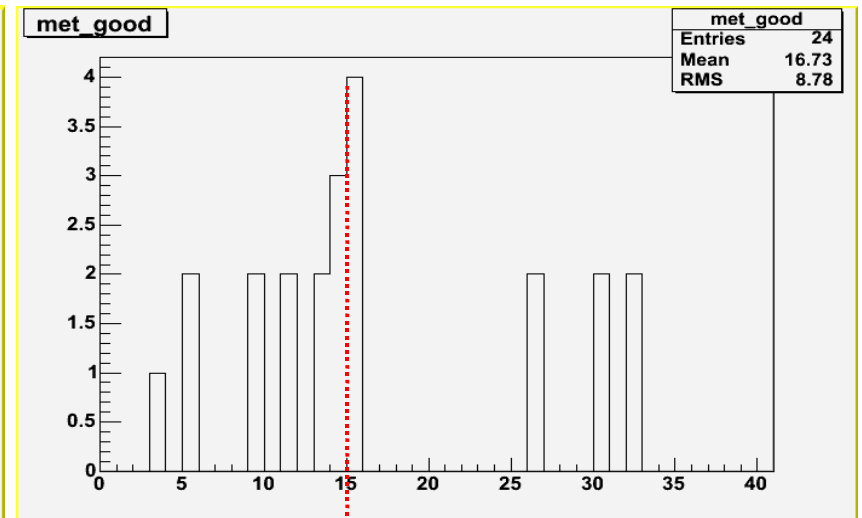
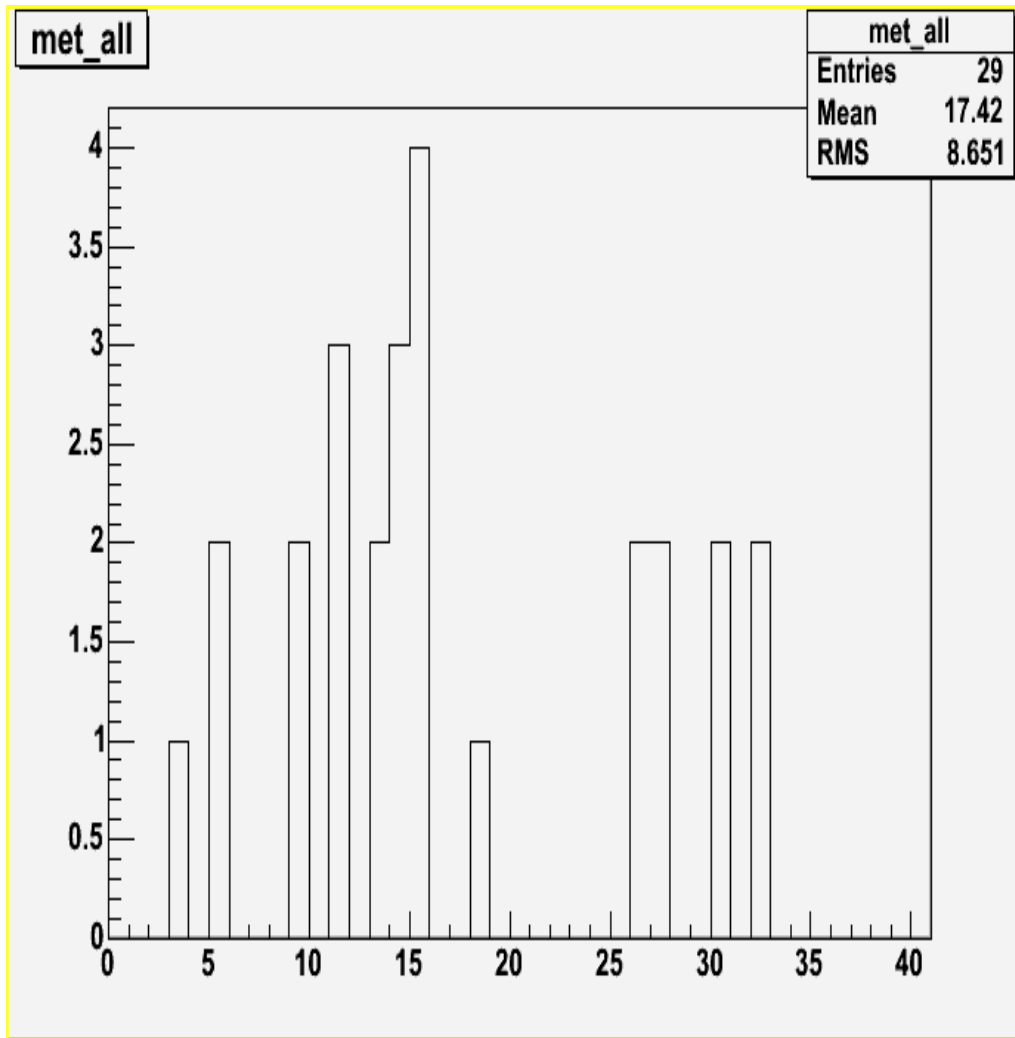
(no missing ET cut) = 87.9 \pm 1.1%
(missing ET < 15 GeV) = 92.6 \pm 1.1%

data: Jetmult ≥ 2



(no missing ET cut) = 81.4 \pm 3.4%
(missing ET < 15 GeV) = 93.2 \pm 2.9%

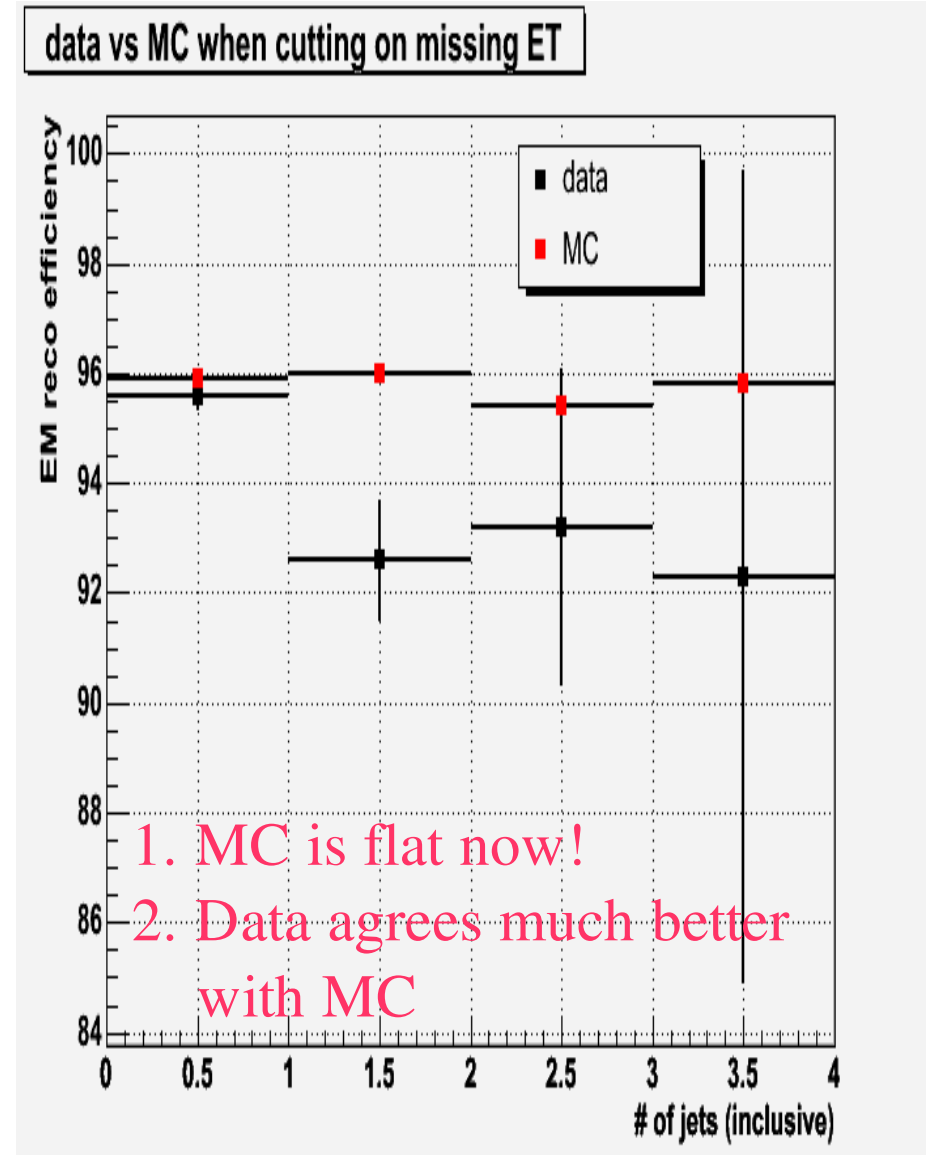
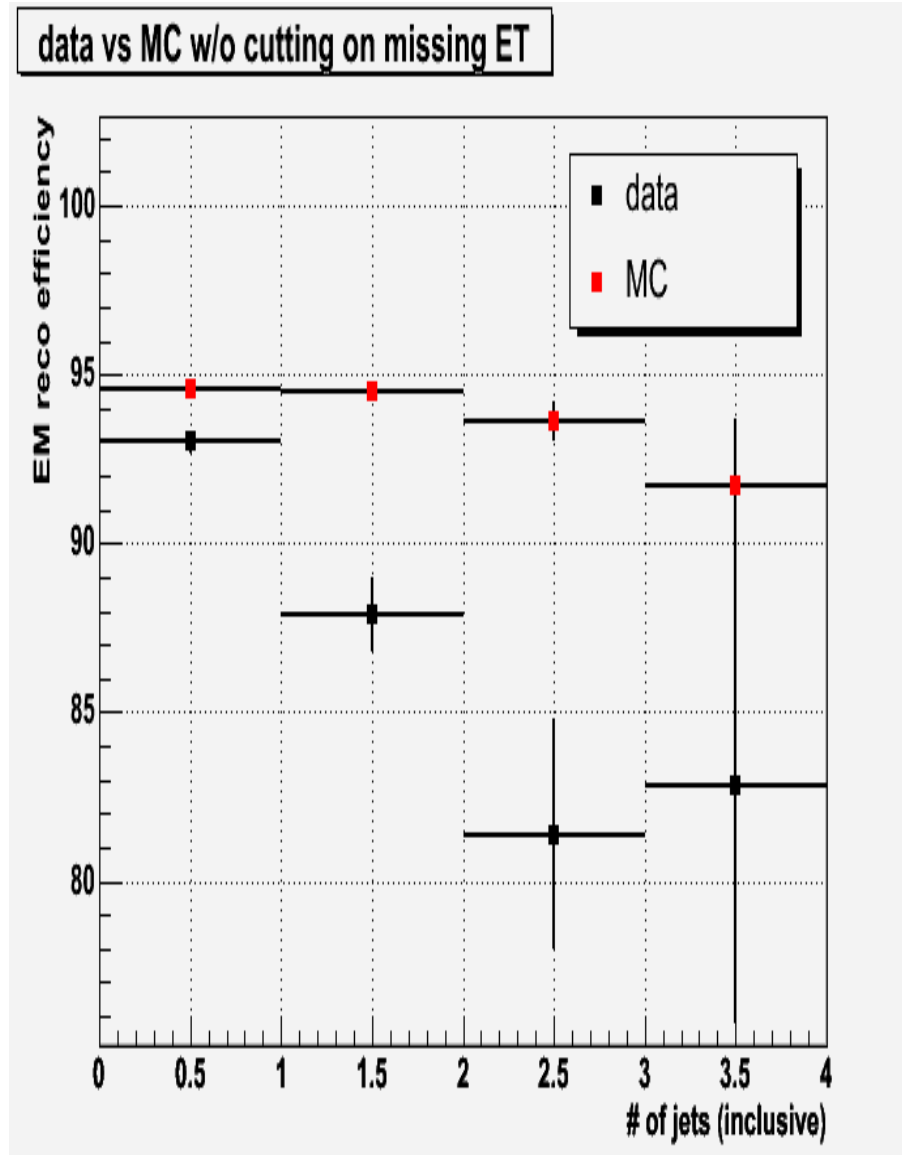
data: Jetmult ≥ 3



(no missing ET cut) = +-%

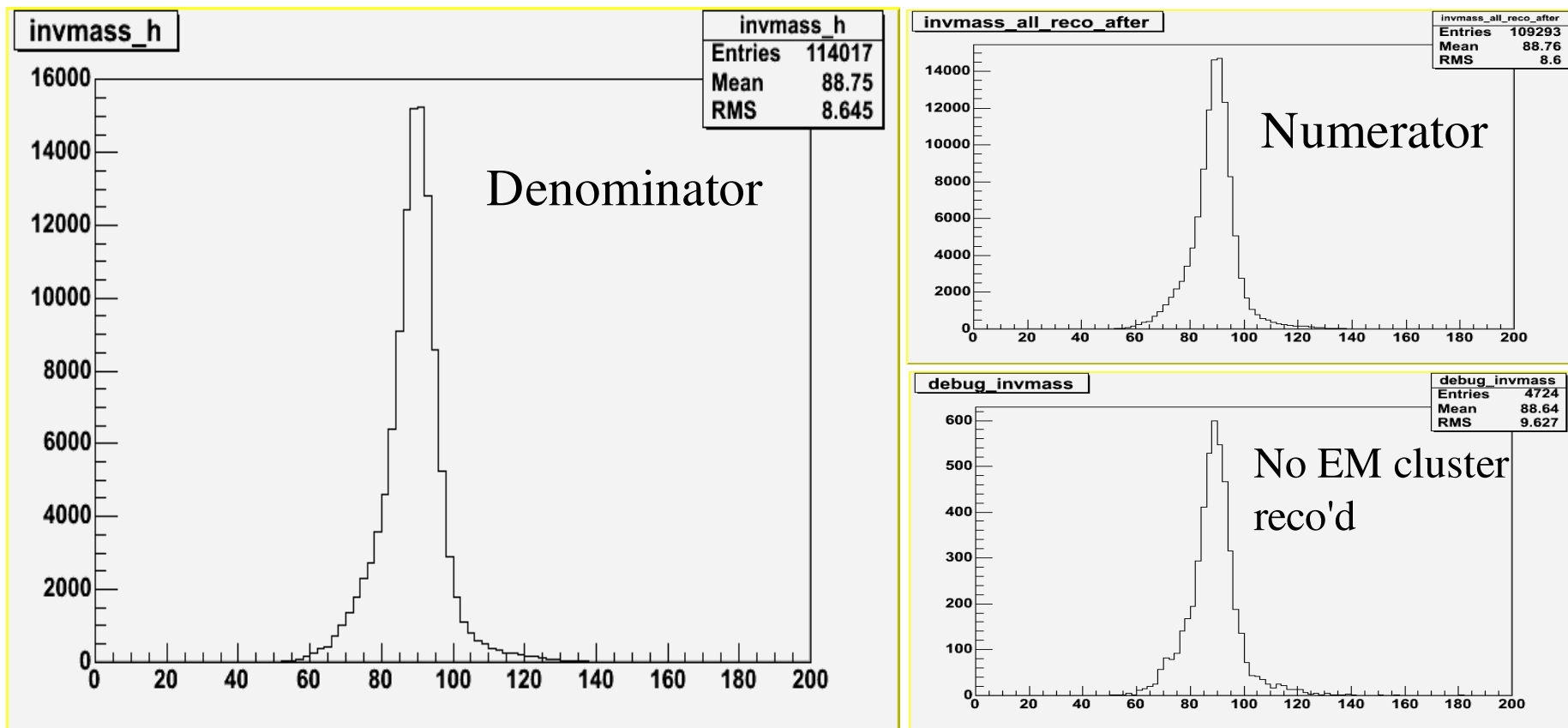
(missing ET < 15 GeV) = 92.3+-7.4%

Comparing data to MC w/ and w/o missing ET cut (15GeV):



Now adding sideband subtraction to clean up residual background, ie applying opposite sign cut, missing ET cut and sideband subtraction!
(Sidebands: 40-70GeV and 110-140GeV)

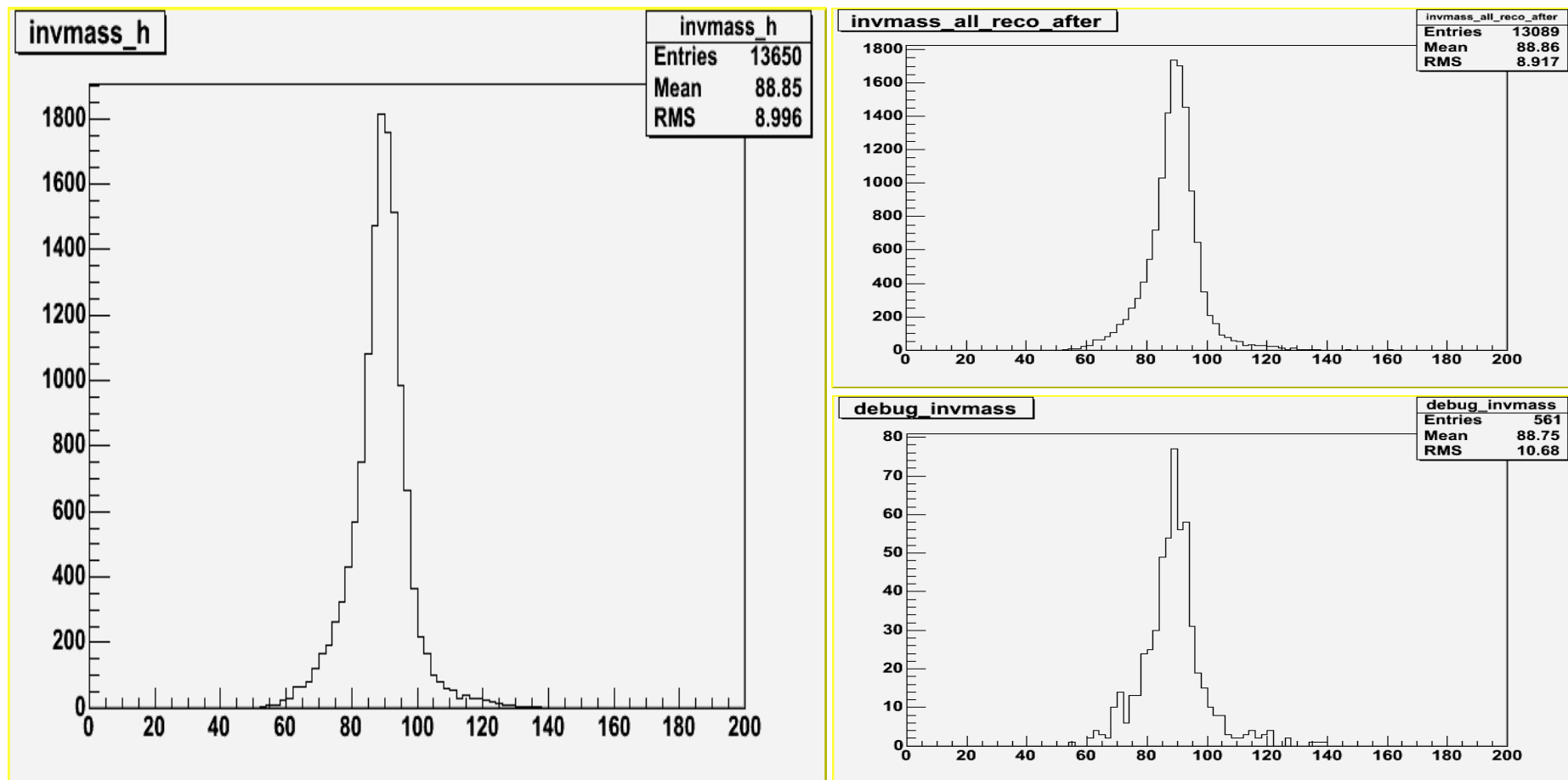
MC: Jetmult ≥ 0



(no sideband subtr) = $95.9 \pm 0.1\%$

(with sideband subtr) = $96.0 \pm 0.1\%$

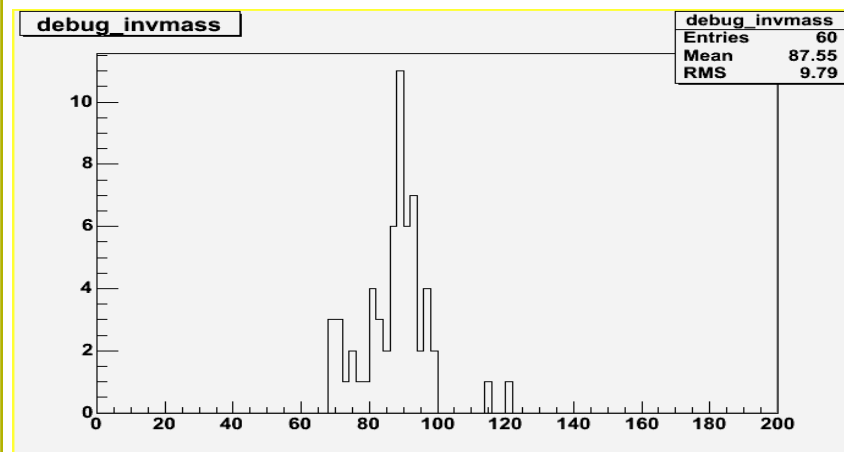
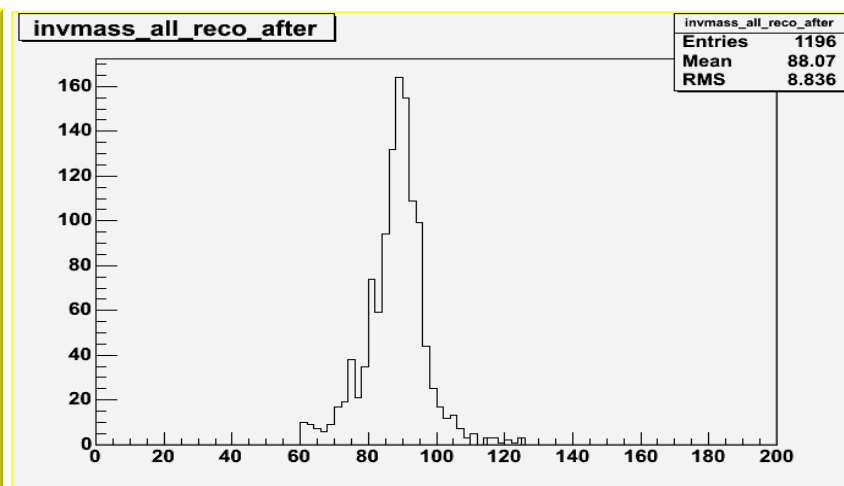
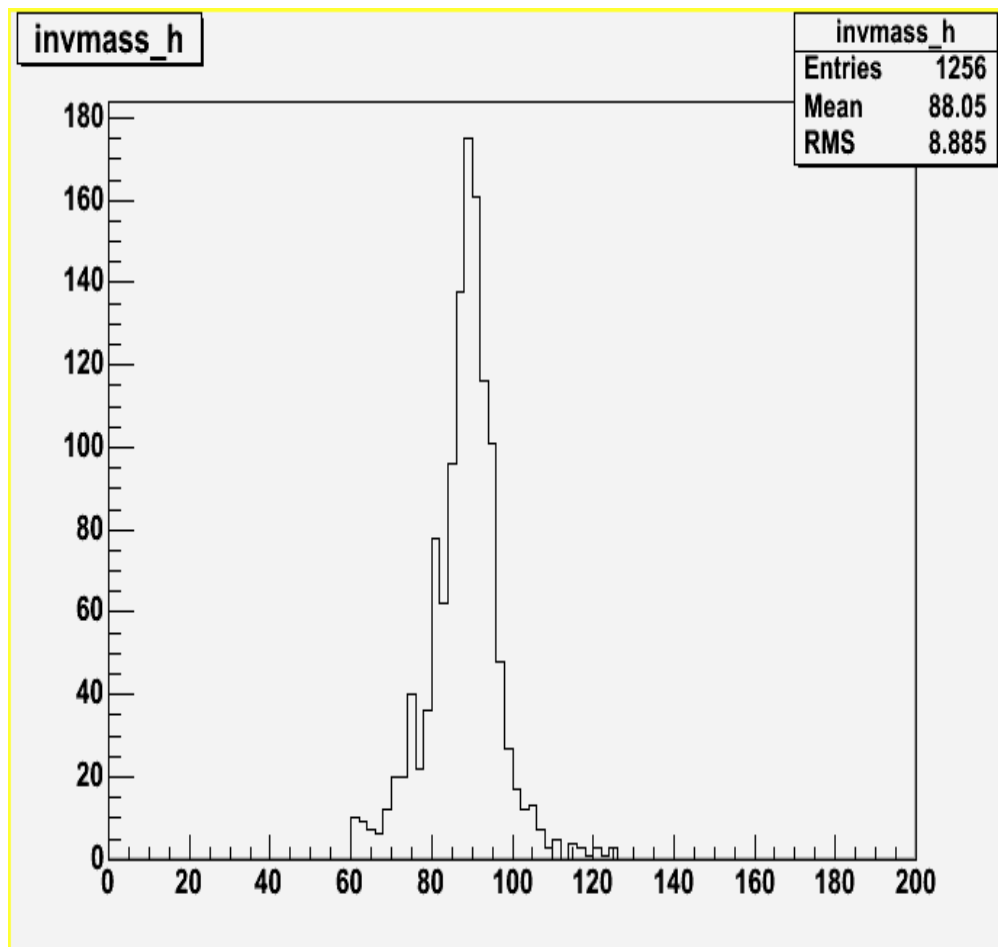
MC: Jetmult ≥ 1



(no sideband subtr) = $96.0 \pm 0.2\%$

(with sideband subtr) = $96.1 \pm 0.2\%$

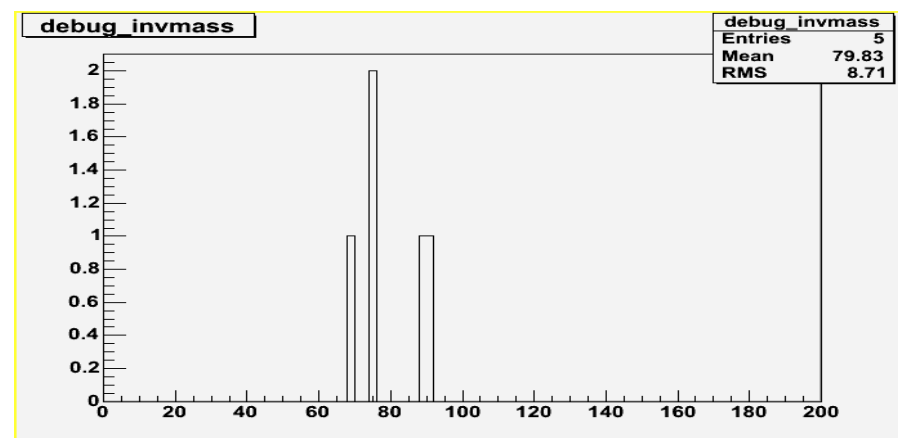
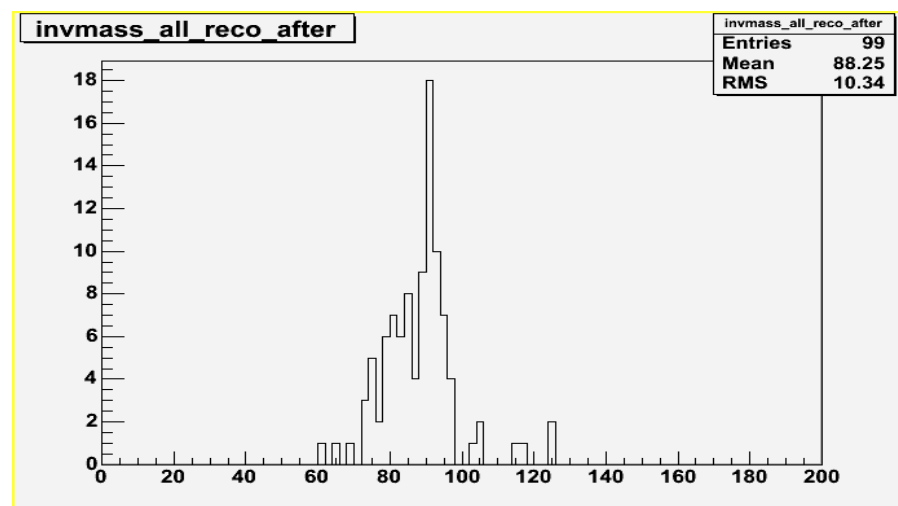
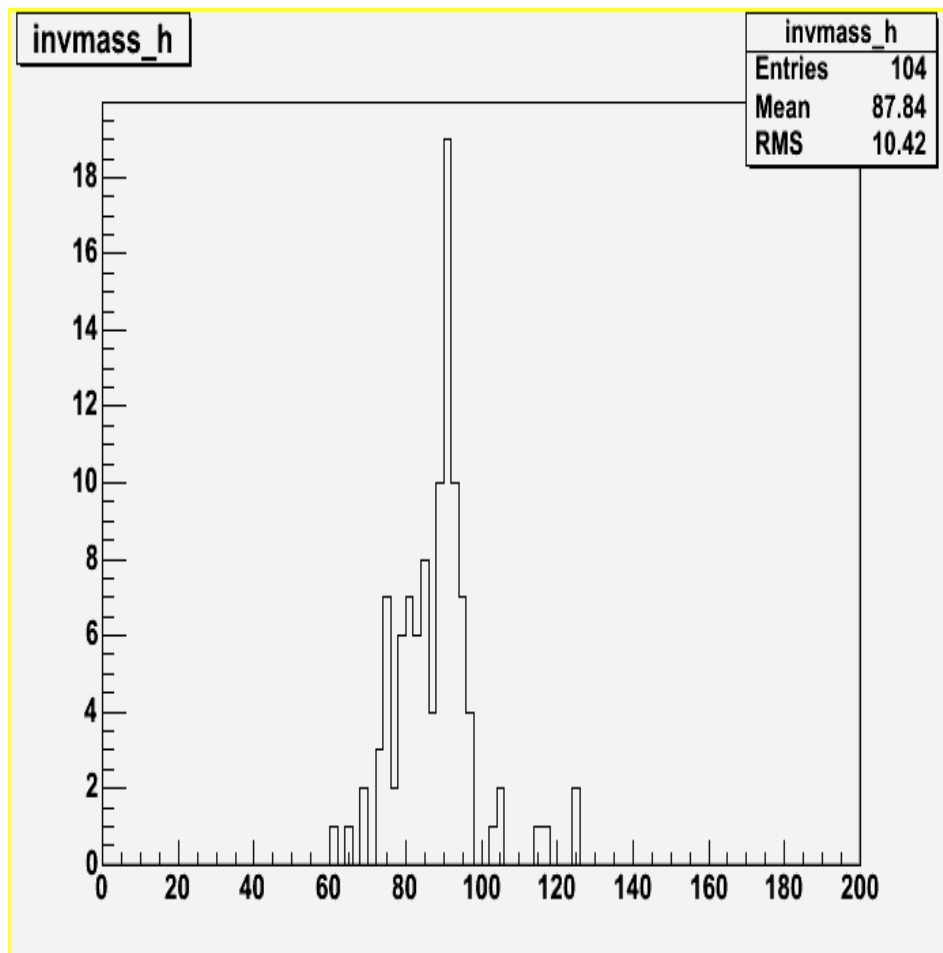
MC: Jetmult ≥ 2



(no sideband subtr) = 95.4 \pm 0.6%

(with sideband subtr) = 95.6 \pm 0.6%

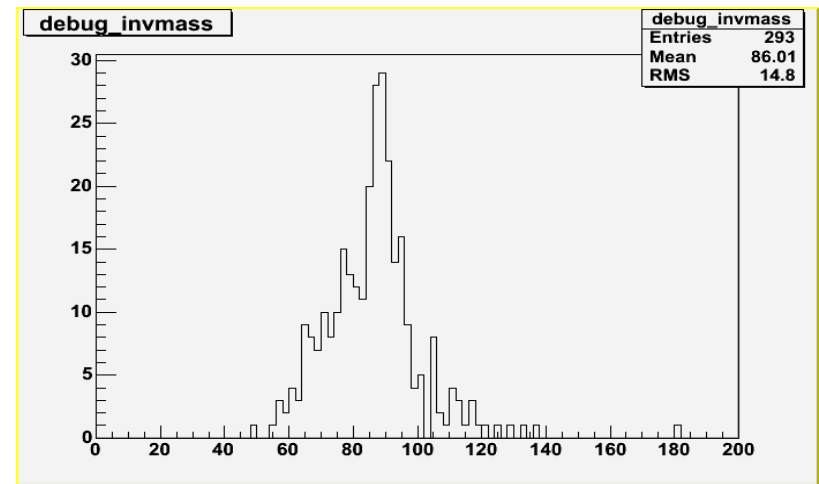
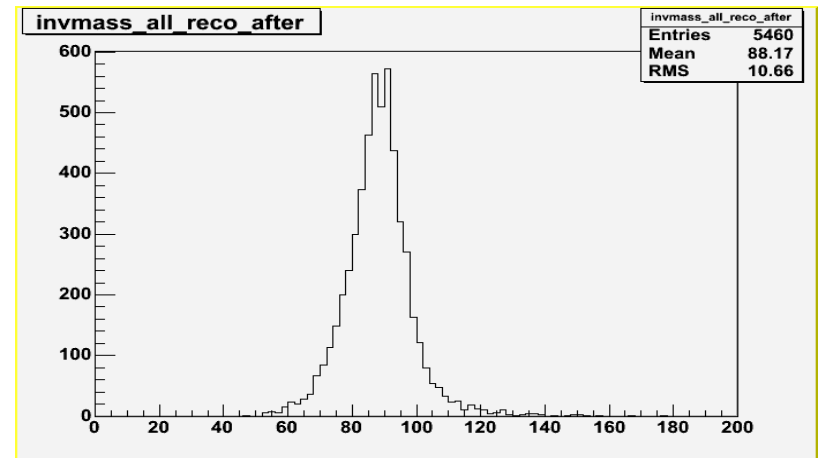
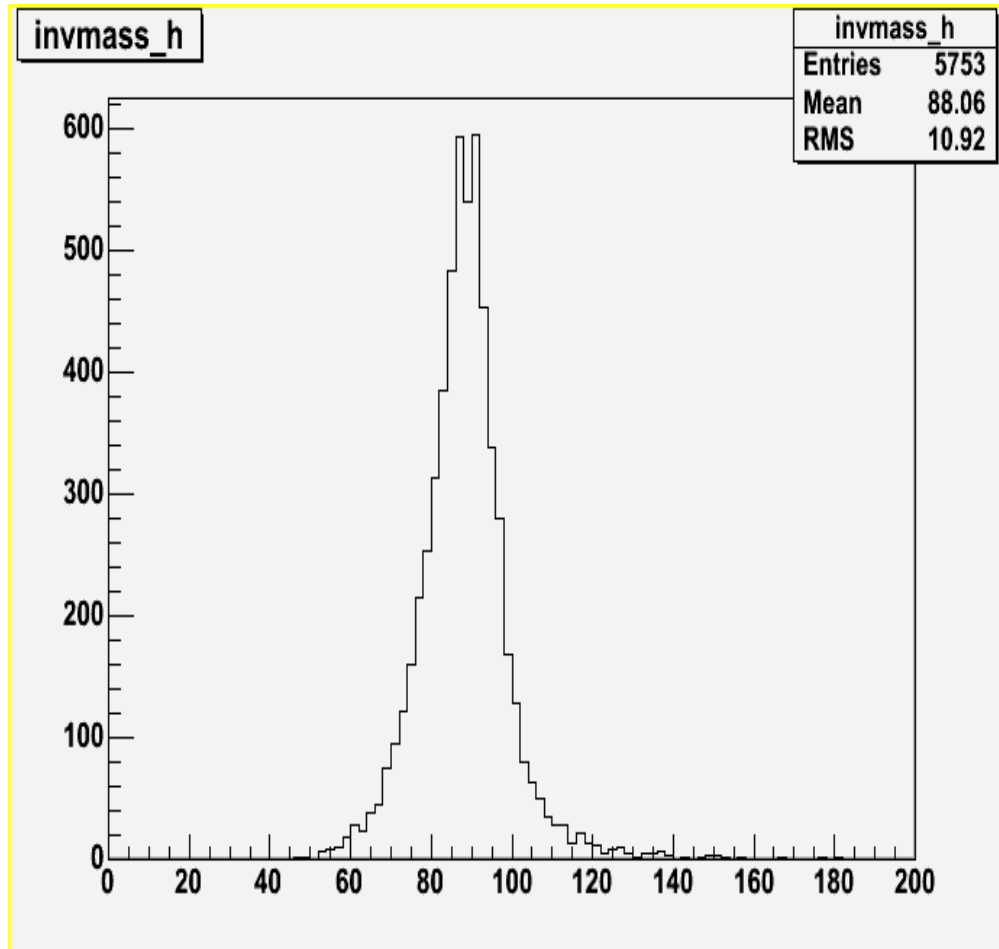
MC: Jetmult ≥ 3



(no sideband subtr) = $95.8 \pm 2.0\%$

(with sideband subtr) = $95.6 \pm 2.1\%$

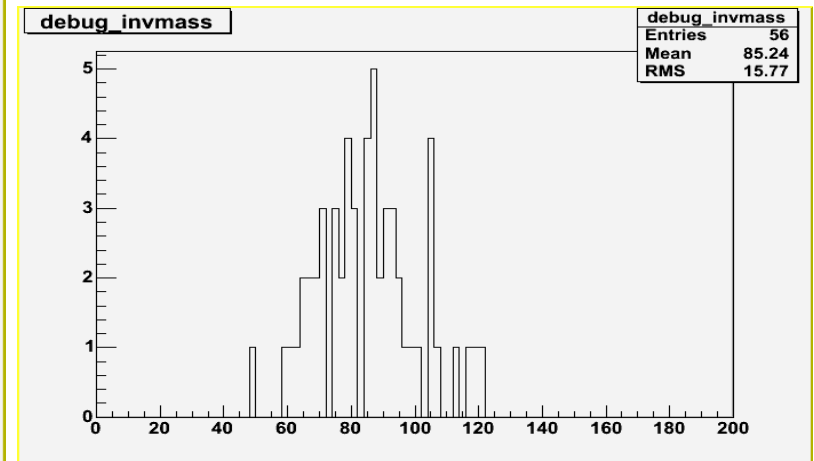
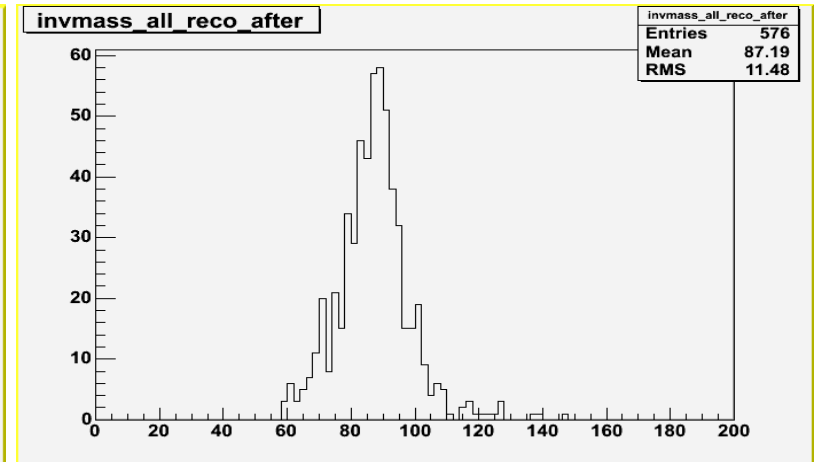
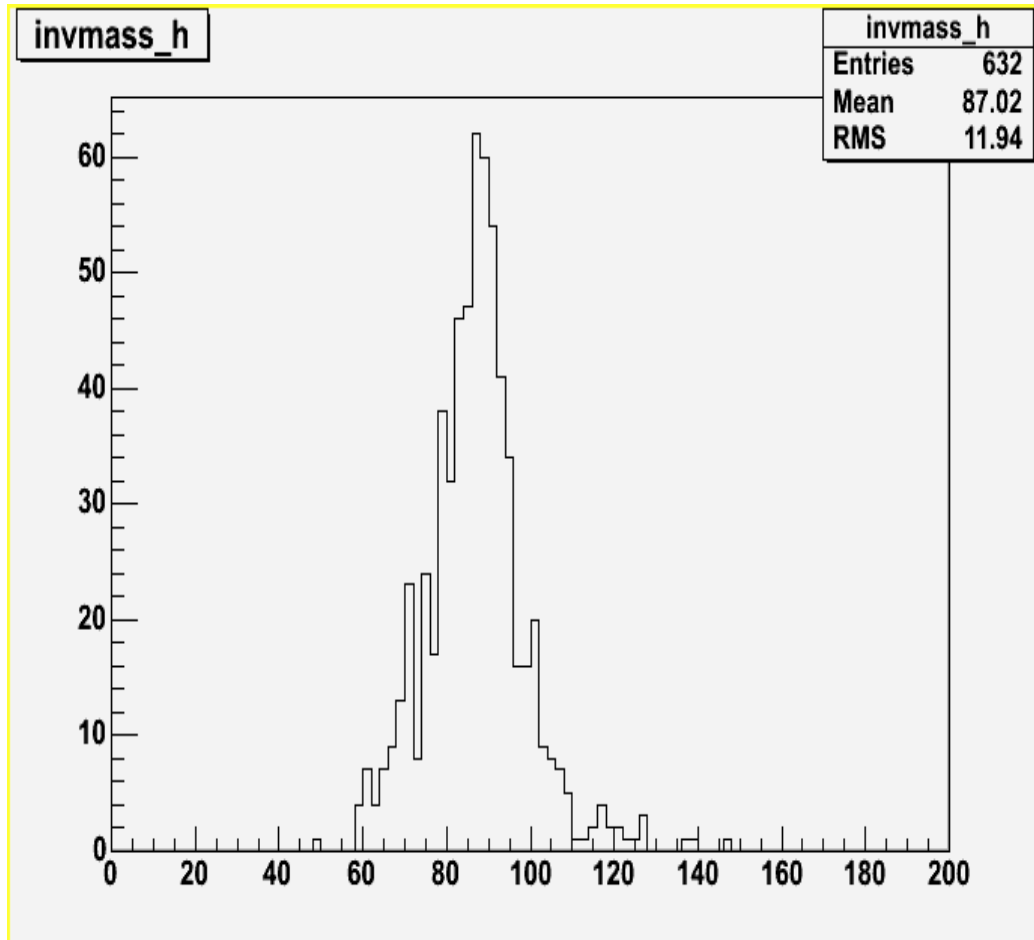
data: Jetmult ≥ 0



(no sideband subtr) = $95.6 \pm 0.3\%$

(with sideband subtr) = $96.1 \pm 0.3\%$

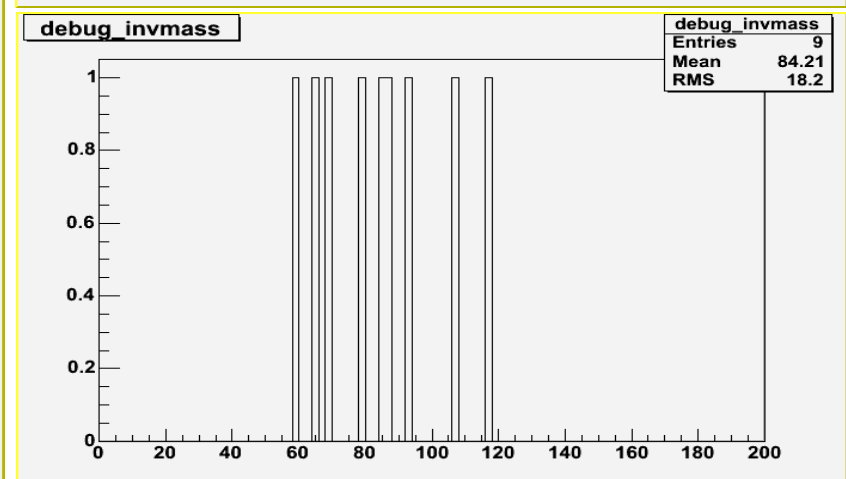
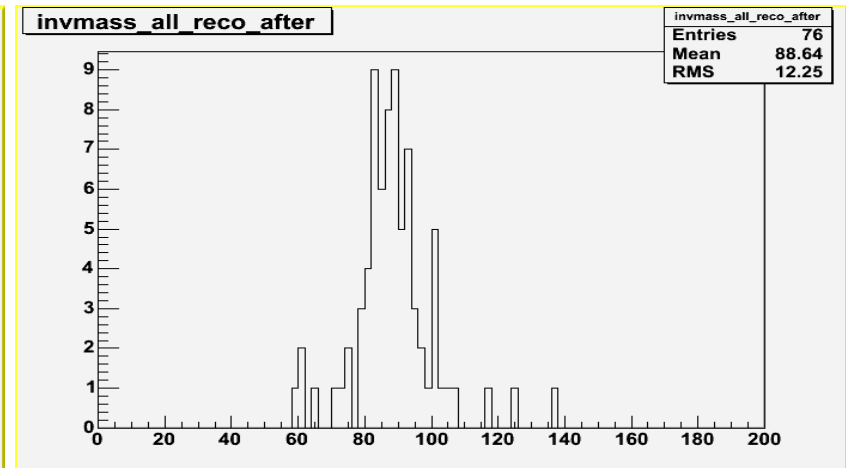
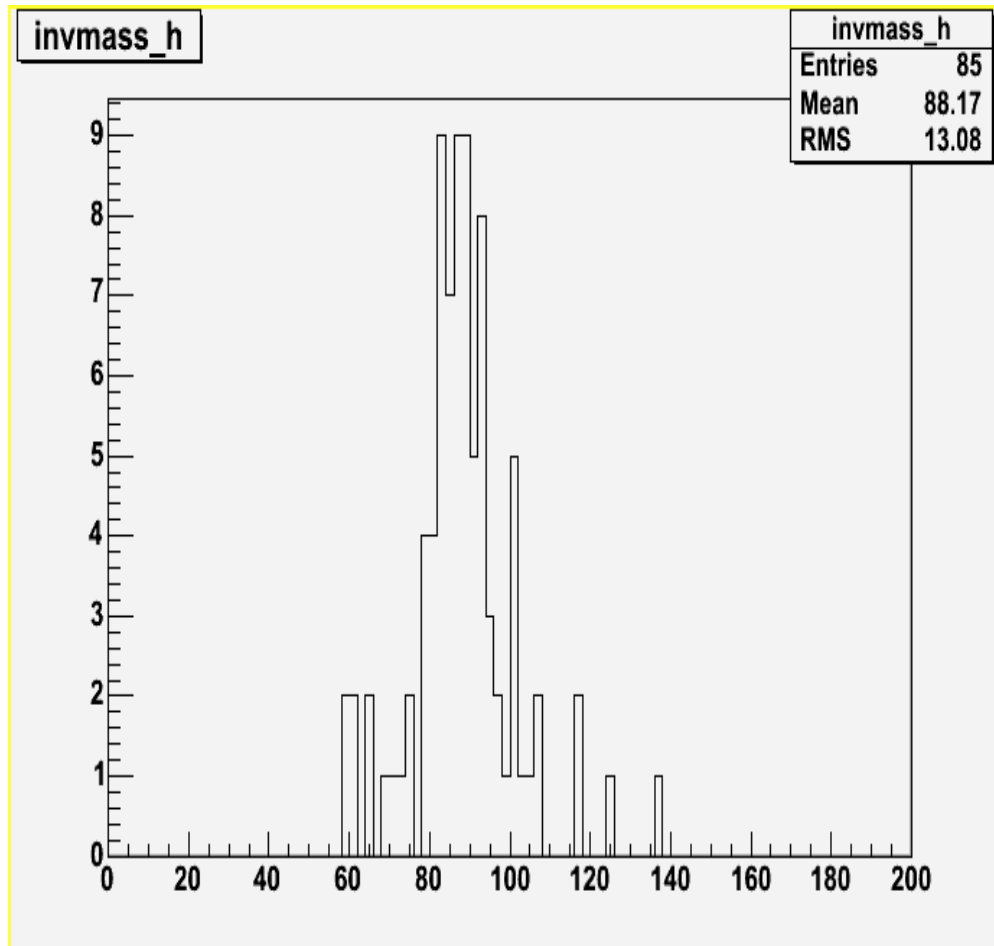
data: Jetmult ≥ 1



(no sideband subtr) = $92.6 \pm 1.1\%$

(with sideband subtr) = $\pm\%$

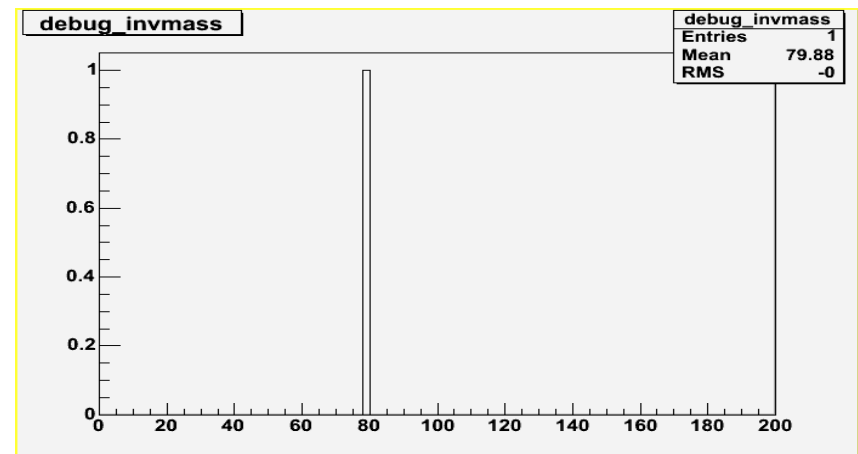
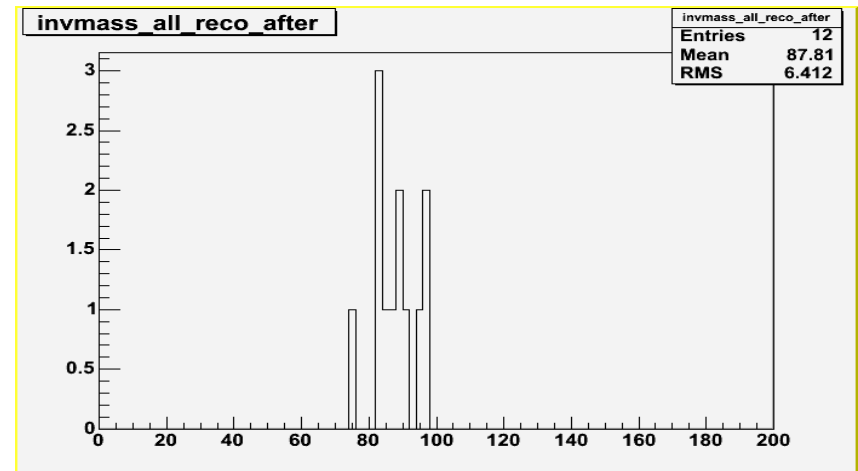
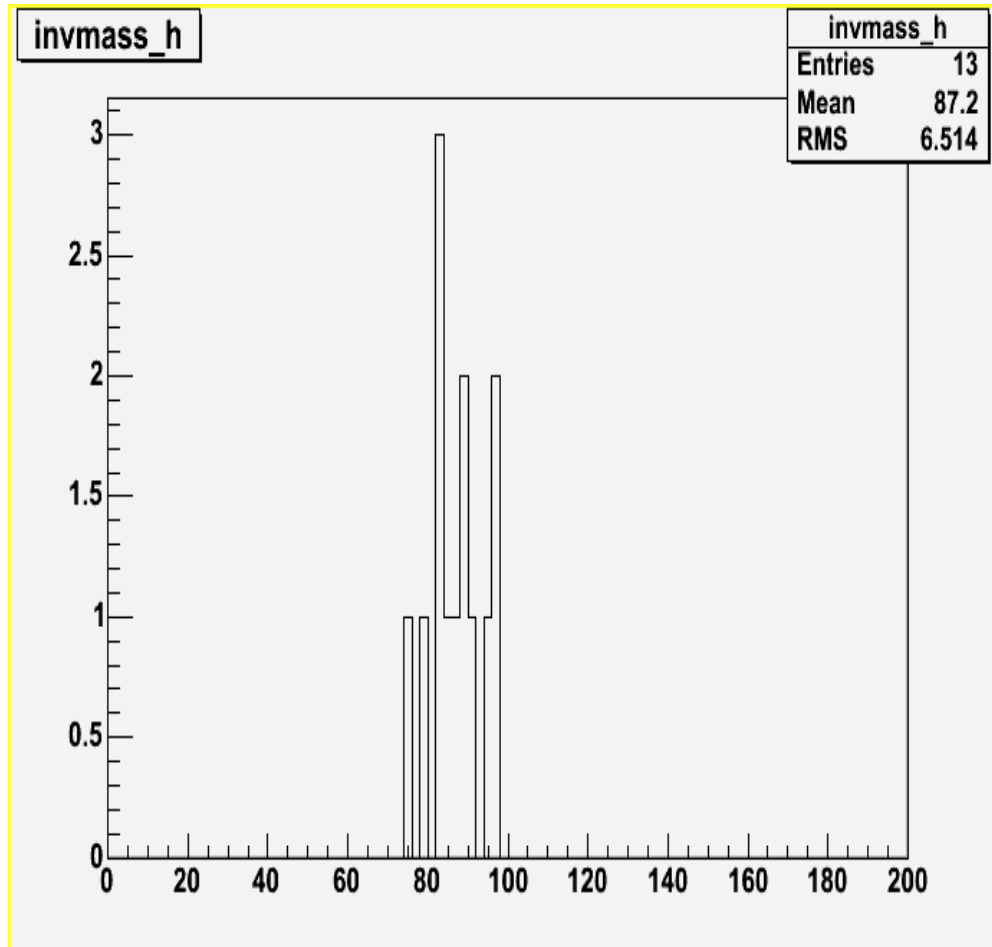
data: Jetmult ≥ 2



(no sideband subtr) = $93.2 \pm 2.9\%$

(with sideband subtr) = $95.5 \pm 2.5\%$

data: Jetmult ≥ 3



(no sideband subtr) = 92.3 \pm 7.4%

(with sideband subtr) = 92.3 \pm 7.4%

Comparing data and MC w/ and w/o sideband subtraction
(and using opposite signs and missing ET cut in both plots):

